# FRACTURE OF THE BASIS CRANII FOLLOWED BY ATROPHY OF BOTH OPTIC NERVES AND PECULIAR PSYCHIC PHENOMENA.

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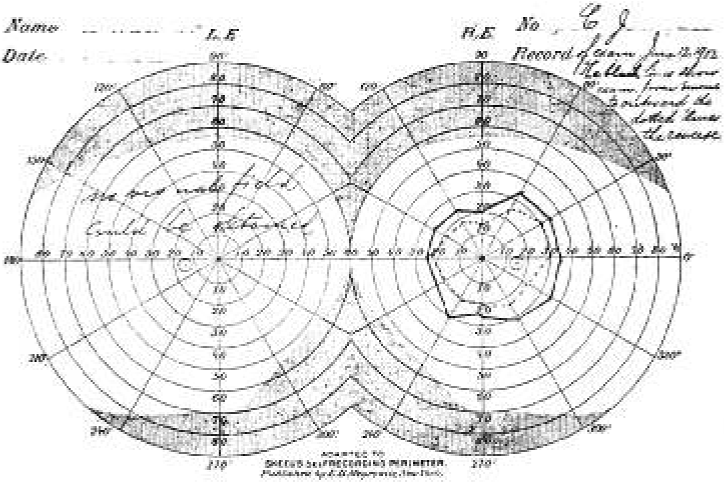
Injuries to the nervous system by trauma often produce symptoms, which make it extremely difficult to distinguish between functional and organic lesions, and only a thorough study of the case at issue is able to save us from a grievous mistake in our diagnosis. The presently described case, which, however, shows the combination of functional and organic nerve lesion, might serve as a fitting illustration of this fact.

C. J., 26 years old, married, a railroad switchman at Berlin, Germany, was injured while weighing cars, June 6, 1902. The handle of a car struck him over the left eyebrow, lacerated the skin and underlying tissue, the wound being 5 centim. long. The man was unconscious for a short time, and had to be taken to a neighboring hospital, where he was bandaged and subsequently sent home. For a number of days he could not be induced to speak, nor would he answer any questions. With his eyes open, he simply stared into space. During that time blood oozed from his nose and mouth, and the hemorrhage continued until a week after the injury. About this time he began to speak again; his whole character, however, had undergone a complete alteration. Heretofore he had been a good-natured, jovial sort of a fellow, had provided for his wife and child, and was always sober and industrious. Now he had changed. He remained all day sitting in the same position, brooding and apathetic; neither wife, child nor any person could excite his interest. When asked questions persistently, he trembled like a leaf. His sleep was disturbed; often he jumped from his bed during the night, asserted he saw persons who wanted to kill him, and appeared very much excited and frightened. At other nights he paced restlessly through the room, whistled and believed himself at work in the railroad yard. At such times the perspiration rolled copiously from his face.

When frightened he seemed to look for an exit to escape, but he peculiarly never attempted to flee from the house. Frequently he abused his wife, who is very devoted to him, even chastising her bodily. His appetite is very poor, and he often refuses to eat, claiming his wife intends to poison him. In view of this, he was taken to the Royal Charity Hospital and placed in the ward for the insane. There he remained seven weeks, and was permitted to be taken home by special request of his wife. For a few days he seemed more quiet and reasonable, so that even an attempt was made to give him some light employment as doorkeeper. Two hours later, however, he collapsed, was unconscious for several hours, and was again taken to the hospital, where he remained a number of days.

Patient was brought to our policlinic June 12, six days after the accident, for the first time. The examination resulted as follows:



Examination of June 12, 1902. The solid lines show the visual fields examined from within outward; the dotted lines the reverse.

Patient is of medium height, not well nourished, and looks pale. He complains of pain over the eyes and in the occipital region. He has no desire to speak, and answers questions, when persistently asked, slowly and in monosyllables.

Examination of eyes: O. D. V. = 5/15 (+ O, 5 D). O. S. V. = alleges he can only count fingers right before the eye; *re vera* 1/15, later 2/15; reads Schweigger 3, 5 ? stereoscopically.

Perimetric examination of left eye negative; the right shows a large concentric contraction of the visual field, as demonstrated by the accompanying table, the black lines showing the limits, taken from inward outward, the dotted lines those from outward inward. Movements of the eyes are free, blepharospasm. The fundus of both eyes appears normal; the pupils do not vary in size. The reaction of the right pupil to light and accommodation is prompt; the left reacts slowly and insufficiently. Consensual reaction prompt. The other nerves of the brain do not show any abnormality. The patellar tendon reflexes are weak. The diagnosis at that time was post-traumatic hysteria.

The second examination took place December 12.

Patient looks anemic. His face is perfectly expressionless and masklike. The corrugator supercilii is much contracted. Though he complains of pain in the head, his skull is nowhere sensitive to percussion, except over the left orbita, the seat of the original injury.

Movements of the eyes apparently free. Blepharospasm of both eyes. Visual power: O. D. V. = 5/20 (+ O, 5 D). O. L. V. = Movements of the hand noticed right before the eye. Perimetric examination of right eye as before.

Ophthalmoscope showed right fundus without abnormality; the left papilla was distinctly excavated.

*Olfactorius*—Complete anosmia left.

*Oculomotorius, Throchlearis, Abducens*—Normal.

*Facialis*—Normal, except the blepharospasm mentioned.

*Trigeminus*—The complete sensory portion of the left side, viz.: Conjunctivæ, cornea, skin, mucous membrane completely paralyzed.

*Acusticus*—Complete anacusis left.

*Gustatory portion of glossopharyngeus*—Left side completely paralyzed.

*Sensibility*—Anesthesia and analgesia of entire left half of the entire body from the middle line, and extending from the scalp to the sole of the foot, even penis and scrotum being half anesthetic.

*Motor power* of left side much weaker than right, and moderate atrophy of left biceps and thenar and hypothenar. The left leg is dragging while patient walks.

Electric examination fails to show degeneration reaction.

Patellar tendon reflexes of both legs are exaggerated. Abdominal and hypochondriac reflex of the right side well pronounced, left hardly noticeable.

Cremaster reflex, left, absent.

Neither Romberg nor Babinski phenomenon.

All other organs apparently healthy.

*Psychic examination*—Patient attended the public school until his fifteenth year; he has passed all grades except one without difficulty. He never showed lack of comprehension, nor was he inattentive or negligent. At this examination his face shows no mimic play, and he is void of intelligent observation. The muscles of his forehead are deeply contracted. He answers questions only when repeatedly asked, and his remarks and answers are neither prompt nor thoughtful. Simple arithmetic problems he solves as follows: 8 × 5 = 45. 7 × 3 = 26. 3 × 12 = 41. Others he fails to solve altogether. He lives in Berlin, but does not know that a river flows through the city, nor can he give the river's name. Never heard of it. Being asked the German emperor's name, he hesitated, and after two minutes' time answers: "Wilhelm," but whether the first or second he is unable to say. When questioned whether it would grieve him if his only child should die, he merely answered, "No; he had also to die." He says the railroad officials are persecuting him; they wanted to keep him in the asylum, and if he could have a chance to get at them, he would take a knife and kill them. He is, however, not able to give any reason why these men should wish to harm him. Since the accident patient has been sexually impotent. The family history is in regard to nervous or mental diseases, as well as cancer or tuberculosis negative. Patient has never had any serious illness, nor has he ever been infected with lues. He drank and smoked but very moderately. His wife is healthy and never had any miscarriage. The only child, one and three-quarter years old, is also healthy.

Examination of February 11, 1903:

Eyes: O. D. V. = 5/25 Fundus normal. O. L. V. = Complete amaurosis. Complete white atrophy of optic nerve. Otherwise no change.

Examination of March 20, 1903: O. D. V. = 5/25. The optic nerve shows distinct signs of white atrophy, the temporal half being much paler than the nasal. Otherwise no change.

Before entering into the pathogenesis of the case, we will try to develop the diagnosis historically.

During the first examination, patient asserted that he could only count fingers directly before the left eye. It was, however, determined that, *re vera,* he coul dsee 1/15 and later even 2/15. In addition to this appeared the concentric contraction of the visual field of the right eye, the weak patellar tendon reflexes and the psychic condition. From these symptoms at that time, the diagnosis—"post-traumatic hysteria"—seemed justifiable; remarkable, however, was the insufficient and tardy reaction of the left pupil to light and in accommodation, while the consensual reaction was prompt; and also the decrease of vision of the left eye in conjunction therewith. This ought to have raised some doubt as to the correctness of this diagnosis.

At the second examination appeared as a prominent symptom the hemianesthesia. This fitted well into the frame of the hysteria; but in the meantime the condition of the left eye had become such that no doubt could exist that an organic lesion of the optic nerve must have occurred. We had now almost complete left amaurosis; the pupil did neither react upon light nor in accommodation, and the papilla showed a distinct excavation, which had not existed at the time of the previous examination. In view of these facts, we could rightly assume that we had to deal with a combination of an organic nervous lesion with a functional neurosis, and the subsequent atrophy of the left optic nerve proved this to be correct. And now had the contraction of the visual field of the right eye a different meaning also. Gradually the sight of this eye was reduced from 5/15 to 5/25, and at the examination of March 20 we could state that the right optic nerve was in a stage of beginning white atrophy, the temporal half being decidedly paler than the nasal. The injury which caused the left optic atrophy must have extended also to the right optic nerve. With the explanation of this condition, we will now enter into the pathogenesis of the case.

A dull instrument struck the patient on the left frontal bone at the orbital margin, causing a lacerated flesh wound 5 cm. long, The patient was unconscious during a short time, and blood oozed from mouth and nose. We might mention that this last condition was not ascertained at the first examination, but was only detected at the second. Six days after the occurrence of the accident it was found that the sight of the left eye had been almost completely lost, and that the visual field of the right eye was contracted materially. We have consequently to conclude that the base of the skull had been fractured, the fracture being an indirect one, caused by contre-coup. We must assume that the fracture commenced at the sella turcica, hence the hemorrhage from the mouth; thence it extended through the lamina cribrosa, the horizontal plate of the ethmoid, which explains the nosebleeding. From there the fracture involved the lesser wing of the sphenoid and the canalis opticus. This view is supported by the important examinations of Hoelder (Graefe-Saemisch's Handbuch), who found in his autopsies among 86 fractures of the base, 43 of the canalis opticus. Generally the upper wall of the canal is fractured, and the fracture goes in an anteriorly convex arch to the margin of the lesser wing of the sphenoid bone, as a result of which the anterior clinoid process is broken off. In our case it is evident that the left optic nerve was, by virtue of the fracture of the canalis opticus, almost totally lacerated; which is fully understood, if we remember that the upper part of the sheath of the optic nerve is most intimately attached to the periosteum of the canalis opticus. We might mention that the oral and nasal hemorrhage could have also been caused by a fracture of the petrous portion of the temporal bone, the blood in this case finding a passge through the Eustachian tube into the pharynx; and the left anakusis would find an explanation even in this supposition. The acustic nerve, however, runs in such close proximity to the facial, that an injury of one must involve the other also, which we know is not the case; and, furthermore, we easily see that the left-sided deafness is only a part of the general anesthesia and of the disturbance of the sensory nerves of the entire left side. Likewise we have to exclude the possibility of the optic nerve being injured at the chiasma or the optic tract, for in such case a hemianopsia would have been the necessary consequence, which did never exist.

Somewhat more difficult is the explanation of the condition of the right eye; but the initial contraction of the visual field, the subsequent reduction of sight and the final atrophy of the optic nerve after nine months permit us to conclude tha tthe optic canal of the right side was likewise fractured or fissured. The injury here, however, was of a degree much more moderate, in consequence of which the optic nerve itself was originally not much injured, especially not in the maculo-papillary fibers, which explains why the central sight was fairly good, while the periphery had already suffered. The subsequent atrophy, we might well assume, was caused by direct pressure upon the optic nerve during the process of reparation of the bony fracture of the optic canal and by the formation of callus. The late atrophy might be explained by the experience of Bergmann, according to whom the reparation of the fractures of the skull are much slower than those of any other bones of the skeleton. Especially is this the case with fractures of the base. There also might have taken place a minor hemorrhage into the vaginal sheath of the opticus, which was observed in cases of basal fracture by Hoelder. This would in no way change the aspect of the issue, but we wished to mention it, nevertheless.

Speaking now of the psychic condition of the patient, we find a distinct psychosis, which we can term a depression, with hallucinations, and we also see symptoms of grave hysteria. The most prominent symptom of the latter is the left-sided hemianesthesia. The only other hemianesthesia which could come here into consideration would be that which is caused by lesions of the most posterior part of the inner capsule; but that certainly would affect the opposite side, and we have no cause to assume that the right internal capsule could have been injured in this case.

The psychosis, which resembles melancholia in its different forms—agitata, attonita and hallucinatoria—is probably caused by lesions of a subtle nature to the cortex, and the severe disturbance of intellect could not be otherwise explained.

The blepharospasm, we do not think, is of a hysterical nature, but rather believe that it is caused by the injury to the optic nerve. Wilbrand and Saenger have recently mentioned analogous observations.

The paretic condition of the left lower extremity, demonstrated by the patient dragging the left leg while walking and by the diminished motor power and the moderate atrophy of the left arm, could be considered hysterical, especially because no degenerative reaction was shown, but that the atrophy was most outspoken in the biceps of the arm and the thenar and hypothenar of the hand speaks more for lesion of the spinal marrow, which is at the present time too obscure to be correctly located. Probably at some later period we will have more light on this point.

Summarizing, we wish to acknowledge that the case we have presented is not yet clinically closed, and our conclusions and claims have not been proven upon the dissecting table; yet we feel that we may be justified in publishing the same, many points being of unusual interest, and no analogous case having been found in the pertinent literature.

First—We have a severe organic lesion to the second cranial nerve, and in connection therewith the symptoms of a severe functional neurosis; in addition we have not alone a mental disease without a hereditary, toxic or specific basis, but also peculiar distinct symptoms, which belong exclusively to spinal diseases.

Second—The time, which lies between the original injury and the atrophy of the optic nerves—8 resp. 9½ months— is quite unusual. In the cases of fracture of the base found in the literature, few weeks, not even months, sufficed to show the first signs of atrophy, which developed latest in two or three months.

Third—From the first examination we might easily see that the attending surgeon suspected the patient to be, if not a simulator, at least an exaggerator, while the man was practically blind upon the left eye. This teaches us to be careful in our judgment, because in general we are too much inclined to go into examinations of post-traumatic neuroses with a certain prejudice against the truth of the statements of the patient, which was in this case instrumental in influencing the original diagnosis.

Fourth—We like to plead that in cases of post-traumatic neuroses, which so frequently occur after railroad accidents, the expert testimony ought to be given only by neurologists, who are the competent judges of this class of cases.

Closing, we beg to thank Prof. P. Silex for his permission to describe the above case, and to Dr. A. Hayn for the help extended.

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